

obligation to supply information to the Ordnance Survey Department in order to enable current revision to be better carried on.

20. That in future the term "revision" should be confined to the bringing up to date on its existing scale of a map already published, and that the term "resurvey" be applied to the operations necessary for the production of maps on a scale larger than that on which they were originally published.

21. That the Ordnance Survey Department be allowed to control its own supply of paper and printing material.

22. That the map on the scale of four miles to an inch be revised as soon as the 1 in. map is out of hand, and be completed with hill-shading.

23. That great freedom be allowed to private publishers desirous of bringing out other classes of maps than those specially published by the Survey Department, and that transfers of the maps on the 1 in. and smaller scales be supplied to publishers at cost price, a small sum being paid as an acknowledgment, and that all other reproduction of Ordnance Survey maps be prohibited.

24. That certain recommendations as to indices and catalogue be carried out.

25. That a book or pamphlet of information as to the Ordnance Survey be published, general in its main features and special for each county, containing the county indices or diagrams (on a reduced scale) and the information formerly contained in the parish area books, and also the table of parish areas now printed on the index of the 6 in. map, which table should in future be omitted from that map, and that copies of the small indices in this pamphlet be freely distributed for public information.

NOTES.

OWING to the large demand for tickets for the Croonian Lecture, which is to be delivered by Prof. Virchow before the Royal Society and their friends next Thursday, it has been decided to hold the meeting in the theatre of the London University, which has been lent for the occasion by the kind permission of the Senate.

THE public dinner which is to be given in honour of Prof. Virchow will be held on March 16, after the delivery of the Croonian lecture, at the Hôtel Métropole. Lord Kelvin will preside, and will be supported by the Presidents of the Royal Colleges of Physicians and Surgeons as vice-chairmen.

AT the Nottingham meeting of the British Association, over which Prof. Burdon Sanderson will preside, Lord Salisbury will be nominated president of the Association for the Oxford meeting in 1894. The following gentlemen have consented to act as presidents of sections at Nottingham:—Section A, Mathematical and Physical Science, Prof. Clifton, F.R.S.; Section B, Chemistry and Mineralogy, Prof. J. Emerson Reynolds, F.R.S.; Section C, Geology, Mr. J. J. H. Teall, F.R.S.; Section D, Biology, the Rev. Canon Tristram, F.R.S.; Section E, Geography, Mr. Henry Seebohm, Sec. R.G.S.; Section F, Economic Science and Statistics, Prof. J. S. Nicholson; Section G, Mechanical Science, Mr. Jeremiah Head; and Section H, Anthropology, Dr. Robert Munro.

AT the ordinary meeting of the Royal Meteorological Society, to be held at 25, Great George Street, Westminster, on Wednesday, the 15th instant, at 7 p.m., a lecture will be given by Mr. Shelford Bidwell, F.R.S., on some meteorological problems, which will be illustrated by experiments.

DR. R. THORNE THORNE, Medical Officer of the Local Government Board, and Mr. H. Farnall, of the Foreign Office, have gone to Dresden, the former as British delegate to the International Sanitary Conference in that city, the latter as assistant delegate.

THE students of the Royal College of Science propose to hold a *conversazione* in the South Kensington Museum on the evening of March 23 next. In the course of the evening Mr. Boys, F.R.S., will deliver a lecture on soap bubbles, illustrated by his own interesting experiments. The evening will be further enlivened by various public singers, and a selection of music will be played by the band of the Grenadier Guards.

IN reply to a question put by Sir Henry Roscoe in the House of Commons on Friday last with regard to the proposed new buildings for the Royal College of Science, Mr. Shaw Lefevre said:—"The accommodation at the Royal College of Science is now undoubtedly inadequate, and in my opinion new buildings must be undertaken at some early opportunity. Block plans were drawn up in 1891 by the professors of the Royal College of Science, showing a suggested appropriation of the land on the south side of the Imperial Institute Road, for the purposes both of the Royal College of Science and of the Science Museum, and these plans were submitted to the Office of Works; but that Department pointed out that it would be premature for them to consider the plans until the Science and Art Department had obtained the sanction of the Treasury to an organisation of their teaching and exhibition establishments on the scale contemplated in the plans. I understand that the Science and Art Department are now in communication with the Treasury in this sense." Sir H. Roscoe having asked when the report from the Science and Art Department would be issued, Mr. Shaw Lefevre said it was not in the nature of a report that could be issued to Parliament, but he should be happy to show it to the hon. member.

LAST week a meeting, convened by the Duke of Westminster as president of the Royal Agricultural Society, was held at 12, Hanover Square, to consider the best means of commemorating the completion of the first half-century of the agricultural experiments which have been continuously carried on by Sir John Lawes at Rothamsted since the year 1843. The Prince of Wales presided. On taking the chair his Royal Highness stated the objects of the meeting. The Rothamsted experiments had from the commencement been entirely disconnected with any external organisation and had been maintained at the sole cost of Sir John Lawes. For the continuance of the investigations after his death Sir John had recently made the munificent endowment of £100,000, besides the famous laboratory and certain areas of land, and had nominated some of the most distinguished men of science of the day to administer the trust. In view of all these facts, and the great national importance of the Rothamsted experiments, it was only fitting that some public recognition should be made of the invaluable services rendered to agriculture by Sir John Lawes and his distinguished colleague, Dr. Gilbert. The Duke of Westminster said they all hoped that Sir John might live for many years to continue to carry on these experiments for the benefit of agriculture. He had great pleasure in proposing the following resolution:—"That, having regard to the great national importance of the series of experiments which have been carried on at Rothamsted during the last fifty years, it is desirable that some public recognition should be made of the invaluable services thus rendered to agriculture by Sir John Lawes, and also by Dr. Gilbert, who has been associated with the experiments during the whole period. That, with this object, subscriptions, to be limited to two guineas, be invited from all interested in agriculture, whether scientific or practical." Mr. Thiselton-Dyer, F.R.S., seconded the resolution—not as an agriculturist, but as one officially and all his life deeply interested in everything that was concerned with botanical science. The extraordinary merit of the work carried on at Rothamsted lay in the fact that those experiments had been continuously carried on under uniform conditions for so long a

period. He ventured to say, as a scientific man, that he knew nothing in the whole records of scientific research more honourable to this country than those experiments which were being carried on at Rothamsted with such self-denying skill. The resolution was then put by the chairman, and carried unanimously. Sir John Evans moved :—"That, in the opinion of this meeting, the testimonial might advantageously take the form of—(1) a granite memorial, with a suitable inscription, to be erected at the head of the field where the experiments have taken place; (2) addresses to Sir John Lawes and Dr. Gilbert, accompanied (if funds permit) by a commemorative piece of plate." This was also carried, and it was unanimously resolved that the following should be requested to act as a committee for carrying the resolutions into effect :—The presidents of the Royal, Royal Agricultural, Linnean, and Chemical Societies, the Earl of Clarendon, Viscount Emlyn, Sir John Lubbock, Sir John Evans (hon. treasurer), and Mr. Ernest Clarke (hon. secretary), with power to add to their number. The Duke of Westminster moved a vote of thanks to the chairman, and the Prince of Wales said, in response, that nothing had given him greater pleasure and satisfaction than to take the chair on that occasion, and to testify, as an agriculturist, his own sense of gratitude for what Sir John Lawes had done for agriculture. Subscriptions to the fund may be sent to any member of the committee, to Sir John Evans, F.R.S., at Nash Mills, Hemel Hempstead, or to Mr. Ernest Clarke, at 12, Hanover Square, W.

LORD SALISBURY presided over a meeting held at Oxford last week, in aid of the building fund of the Radcliffe Infirmary. He delivered a most vigorous address, in the course of which he said that at Oxford the difficulty connected with medical education was the reverse of that felt in London. In London the practical opportunities of exercising medicine were abundant, and the only care, or the main care, which pressed upon those who had charge of education in that respect was lest the more scientific basis of that practice should be neglected or receive inadequate attention. At Oxford, on the contrary, they had abundant means of teaching the group of sciences which were the equipment of the physician. But, necessarily, unless they made a great effort to that end, they should not have the means of presenting those opportunities of practical inquiry which were essential to the formation of the professional ideal, and which in large populations necessarily occurred with so much greater frequency. This movement—for so he looked upon it—on the part of the rulers of the University, to draw somewhat closer to the science of medicine, was only part of a larger movement which had been going on for some time, which, if he might use the scientific language of the day, was part of the evolution of education in our time. He begged to assure the assembly that he had no traitorous views with respect to the study of Greek. In fact he was inclined to say that in recent controversies the advocates of the classical languages had been unduly frightened, and that there was not the slightest danger that the study of them would ever pass from the education of youth or the culture of men of intellect. The issue was not between science and languages, ancient or modern; the issue rather was between the science whose chief food was gathered from observation and the science whose chief food was gathered from reflection. This older science was slowly, very slowly, but still quite evidently, giving way to the sciences which relied upon observation. He always thought that the science of medicine had scarcely received among us all the tribute which it ought to receive among sciences which rest upon observation. It was a curious fact that the whole tendency of scientific thought appeared to be rapidly concentrating itself upon the fields in which medicine reigned supreme. Those infinitely minute beings which certainly for health or sickness deeply affected our existence, and which were so essential to us

that some able scientific men said that we consisted of nothing else, that we were not only a Republic, but were in a permanent state of civil war—these bacilli were attracting more and more the attention of the scientific intellect in Europe. It was dangerous to prophesy, but he did not think that any one who had watched the course of science would doubt that for the generation to come the investigation of these creatures, which had been revealed by new methods of research and by singularly patient labour, and upon which the lives of millions of human beings depended, would figure more largely in the scientific field than any other study. This was the special domain and privilege of medicine. He felt, therefore, that in commending this appeal to their consideration he was doing more than preaching a charity sermon. He was asking them to help that which contained the most brilliant promise for the intellectual future of science in a University by which science ought to be cultivated and where science ought to reign.

AFTER Lord Salisbury's address various resolutions were adopted, among which was one, moved by Prof. Dicey, to the effect that the Radcliffe Infirmary, being the chief hospital for Oxford and a large surrounding district, should be brought into a state of efficiency corresponding with the recent advances in hospital management. Another resolution, moved by the Master of University, expressed approval of the committee's scheme, consisting of the removal of the sick from the old building into more modern wards and the renovation of the old building.

ON Saturday and Sunday last much damage was done in Sandgate, near Folkestone, by remarkable disturbances of land. The first disturbance was felt on Saturday at 7.45 P.M., when a rocking motion was noticed. This soon stopped, but later disturbances were so alarming that many people took their furniture into the streets. According to a correspondent of the *Times*, houses "slipped away from each other, leaving gaping sections," while in other cases the walls bulged out, and great rifts appeared in the ground. In the area affected by the disturbances most, if not all, of the houses are out of line and show cracking. Many of the inhabitants have been brought to great distress by the calamity, and appeals to the public have been issued on their behalf. An inquiry into the cause of the disaster was held at Sandgate on Tuesday by Mr. Walton, Local Government Board Inspector. After hearing evidence the Inspector said that an official report would be sent to the Board. What he had seen led him to conclude that the catastrophe was due to the sudden release of impounded subsoil water, a thing which he believed was remediable by the institution of proper water drains. If that was attended to there was no reason to suppose that such a disaster would ever recur. The *strata* were full of water, which the recent abnormal rainfall had served to increase. That water being released had formed kinds of caverns. The remedies were proper storm drains and intercepting drains, with free outlets under the road to the sea.

THE death of Ludwig Lindenschmit, the well-known German archaeologist, is announced. He died at Mainz on February 14 in his eighty-fourth year. He was the director and one of the founders of the fine Central Romano-German Museum at Mainz, and one of the editors of the "*Archiv für Anthropologie*." Among his works are "*Die vaterländischen Altertümer der fürstlichen Hohenzollernschen Sammlungen*" and his "*Altertümer unserer heidnischen Vorzeit*." He began a "*Handbuch der deutschen Altertumskunde*," but completed only the volume relating to the Merovingian period. Lindenschmit was an enthusiastic advocate of the theory that the Aryan race is of European origin.

THE temperature during the past week has been generally very high for the season, the daily maxima frequently exceeding

55°, and even reaching 59° in the eastern counties on Sunday; whereas the average maxima for the month, deduced from twenty years' observations at the telegraphic reporting stations of the Meteorological Office, range from about 45° in the north to 50° in the south and south-east. During the latter part of last week several depressions skirted our north-west coasts, and rain fell generally every day, although the amounts measured were not great; but on Sunday the type of weather changed, especially over the southern part of the kingdom. An anticyclone advanced over our south-west coasts from the Atlantic, while the air became dryer and conditions more settled, although there was little sunshine in any part of the kingdom. There was a deep depression over Norway on Tuesday, while secondary depressions in connection with it were approaching the north-west of Scotland, and occasioning a return of stormy weather in the northern parts of these islands. From the *Weekly Weather Report* it appears that for the week ending the 4th instant the rainfall was above the average in all districts except the north of Scotland and the south of Ireland. Over the northern parts of England and the east of Scotland the excess was large, owing chiefly to heavy snowfall at the beginning of the period.

AMONG the various marine zoological stations which, on the initiative of that at Naples, have sprung up in recent years, the station at Trieste, on the Adriatic, holds an honourable place. It has been in existence nearly eighteen years. Dr. Claus states (*Naturw. Rundsch.*) that for its double function of instruction and investigation opportunity is afforded both to students and men of science. The students are, primarily, those of the professors of zoology at Vienna University, to whom the management is entrusted; also those of the Graz professor, who has a right to four places out of twelve. Students of other Austrian Universities are also freely admitted to work, and Austrian and foreign investigators. To each worker the ordinary reagents, besides the table, are supplied gratis; also the material, so far as it can be provided without special cost. The station further supplies living and preserved marine animals as specimens to the Zoological Institutes of the Vienna and Graz Universities, sending thither about 120 to 140 specimens annually. Other institutes are supplied on payment as arranged. The number of workers at the station has gone on increasing since it was opened in 1875. Of foreign investigators who have used it may be named Metschnikoff, Kowalevsky, A. Schneider, Selenka, R. and O. Hertwig, Keller, E. van Beneden, Fromann, Braun, and F. Cohn. The results of work carried on there are sometimes published independently, but they chiefly appear in the *Arbeiten* of the Zoological Institute of Vienna University, and the Zoological Station in Trieste, of which ten volumes have appeared. The *Denkschriften* and *Sitzungsberichte* of the Vienna Academy and the German zoological journals also witness to the activity of the station. The Austrian Government has liberally aided this useful institution.

THE new number of the Journal of the Institution of Electrical Engineers contains a report of some very interesting speeches on a paper by Dr. Fleming on experimental researches on alternate-current transformers. The same number includes Mr. Preece's presidential address, from which we have given some extracts. The vote of thanks to the president for his address was proposed by Mr. Spagnolletti and seconded by Sir Henry Mance. Sir Henry said there was one point in the address which had struck him with dismay. That was the gradual increase of the teredo in the neighbourhood of our shores. This fact had been brought home to him that day by specimens of cable recently attacked by "the insect, or mollusc"; and it should teach them—what Mr. Preece had told them many years before—that they should not only survey

the bottom of the sea for rocks and shoals, but should also examine it near the shores to find whether it was infested by that pest, which had damaged hundreds of thousands of pounds worth of cable.

THE results of the solar, meteorological, and magnetical observations made during 1892 at the Stonyhurst College Observatory have just been issued by Father Sidgreaves. They take the commendable form of monthly and annual summaries, so that the most interesting results can be seen at a glance, and compared with the mean results of the last forty-five years. The range of barometer readings was only 1.724, or a quarter of an inch lower than the mean, while the range of the thermometer was seven degrees higher than the mean. The extreme range of the barometer recorded at this observatory is 31.3 inches. Sunshine was recorded for 207 hours in June, 202.1 in April, and only 172 in May. From January to April there is a regular increase, and from June to December a regular decrease, the falling-off in May being very conspicuous. 153 drawings of the sun have been added to the already splendid Stonyhurst series. An appendix contains the results of meteorological observations made at St. Ignatius College, Malta.

WE learn from the *Botanical Gazette* that there are now as many as thirty-two botanical stations in the United States carried on by the various State Governments. The subject which receives most attention at these stations is that of the fungus and bacterial diseases of cultivated crops and of fruit-trees, and their treatment and cure. Some of them give attention to systematic botany, while others are investigating the life-history of certain fungi, or carrying on physiological work. A laboratory for the study of plant diseases has recently been fitted up in connection with the agricultural experiment station of the University of California at Berkeley. It has been arranged that a botanical survey of Nebraska shall be undertaken by the Botanical Seminar of the University of that State. The almost unknown flora of the north central portions of Idaho has recently been investigated, as we have already noted, by a commission acting under the auspices of the Botanical Division of the U.S. Department of Agriculture.

IN the first part of Dr. Millspaugh's Preliminary Catalogue of the Flora of Western Virginia, published in the Bulletin of the Agricultural Experimental Station of Morgantown, a new feature has been introduced in a list of the rich fossil flora of the State.

PROF. ANGELO HEILPRIN, of the Peary Relief Expedition, has presented to the Museum of the Academy of Natural Sciences, Philadelphia, the valuable collection of mollusks dredged by him in Greenland waters. They have not yet been studied, but the conservator of the conchological section, in his annual report, says he has ascertained the presence of a number of species not before in the collection of the Academy, of the genera *Margarita*, *Buccinum*, *Sipho*, and other Arctic groups. The specimens preserved in alcohol are in excellent condition for the examination of the soft parts.

MR. J. W. SALTER, writing to the *Zoologist* from University College, Aberystwith, says that on January 4 last he obtained a polecat about six miles south of Aberystwith. There is reason to believe, he says, that the species is by no means extinct in Cardiganshire.

THE Pharmaceutical Society of Great Britain has issued a volume of papers, most of which describe the results of chemical investigations carried on at its Research Laboratory. The editor is Prof. W. R. Dunstan. The papers are reprinted from the Transactions of the societies to which they were communicated, namely, the Royal Society, the Chemical Society, the Pharmaceutical Society, and the Physical Society. Other volumes of a like kind are to follow.

THE new number of the Journal of the Royal Horticultural Society includes, besides papers on many other subjects, reports of conferences on the begonia and on apricots and plums. There is also a long series of extracts from the Proceedings of the society.

THE second part of the excellent "Canadian Guide Book," by Ernest Ingersoll, has been issued (W. Heinemann). It deals with western Canada, and the author has been at great pains not only to collect full and trustworthy information, but to present it in a clear and attractive style. There are maps and many illustrations.

THE results of an investigation concerning the nature and properties of metallic ruthenium, particularly with respect to the fusing point of this highly refractory rare metal, are contributed by M. Joly to the current number of the *Comptes Rendus*. M. Joly has accumulated no less than three kilograms of pure metallic ruthenium, and has consequently been enabled to carry out experiments upon it on a comparatively large scale. It will doubtless be remembered that ruthenium and osmium are the two most refractory of the metals of the platinum group. Deville and Debray only succeeded with great difficulty in obtaining a few minute globules of melted ruthenium with the aid of the oxyhydrogen blowpipe. The fusion of this metal is rendered very much more difficult owing to the readiness with which, at these high temperatures, it becomes converted into the volatile tetroxide RuO_4 . It was apparent therefore that in order to attain success the temperature must be suddenly raised to a point considerably higher than the melting point of the metal; and in order to effect this a much more powerful source of heat than the oxyhydrogen blowpipe would be required. M. Joly has therefore employed the electric arc, which has recently been shown by M. Moissan to be so admirably adapted for the preparation of refractory metals. At the high temperature of a powerful arc ruthenium is melted in a few seconds, and without sensible loss by volatilisation in the form of tetroxide. Solid ingots of twenty to thirty grams of the metal have been obtained in this manner without difficulty. As the melted metal cools, however, it becomes covered with a coating of the blue sesquioxide Ru_2O_3 and the dioxide RuO_2 . In order to remove this the ingot is placed first in aqua regia, which, however, has no action upon either the metal or the oxides, and subsequently in hydrofluoric acid; finally the ingot is heated in a stream of hydrogen, when it loses the last traces of oxide and the pure metal remains. Pure ruthenium thus obtained in tolerably large quantities after fusion is a greyish-white metal, more nearly resembling iron than platinum in appearance. Its hardness is about the same as that of iridium. It possesses a crystalline structure and is brittle. The density of the metal after fusion M. Joly gives as 12.063 at 0° compared with water at 4° . Employing the same electric arc and under equal conditions in all respects, the fusion of ruthenium appears to be attended with appreciably greater difficulty than that of rhodium and iridium, whose melting points are somewhat higher than the melting point of platinum. Moreover, under the conditions which suffice for the ready fusion of ruthenium, osmium merely sinters, traces of fusion being just apparent. Osmium therefore is the most infusible of the metals of the platinum group. M. Joly is now conducting experiments with the view of determining the actual temperatures of these interesting high melting points.

NOTES from the Marine Biological Station, Plymouth:—The week's captures include the Lucernarian *Depastrum cyathiforme* and numbers of the Gephyrean *Petalostoma minutum*. Kef. Ephyrae of *Aurelia* have been abundant; Hydroid medusae scarcer. Polychaete larvæ and Nauplii continue plentiful, and *Cyphonautes* (larva of the Polyzoan *Membranipora*

pilosa) has considerably increased in numbers. Echinoderm larvæ (*Auricularia*, *Pluteus*) have made their first appearance in the season's townetings. The Nemertine *Nemertes Neesii* and a large eyeless mud-dwelling species of the Polychaete genus *Polydora* (*flava*, Clap. ?) are now breeding.

THE additions to the Zoological Society's Gardens during the past week include a Black-faced Spider Monkey (*Ateles ater*) from Eastern Peru, presented by Miss Gertrude Farmer; a Macaque Monkey (*Macacus cynomolgus*, ♂) from Java, presented by Mrs. Frank Phillips; a Naked-footed Owllet (*Athene noctua*) European, presented by Mr. Albert Stevens; a Four-horned Antelope (*Tetracerus quadricornis*, ♂) from India, purchased; six Wild Swine (*Sus cristatus*), two Badgers (*Meles taxus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

COMET BROOKS (NOVEMBER 19, 1892).—The following is a continuation of last week's ephemeris for this comet:—

12h. Berlin Mean Time.

1893.	R. A. (app.) h. m. s.	Decl. (app.) ° ' "	Log r.	Log Δ	Br.
Mar. 9	0 46 27 ... +20	46° 1' ...	0.1842 ...	0.3563 ...	0.47
10	47 22 ...	34' 4"			
11	48 17 ...	23' 0"			
12	49 11 ...	12' 1"			
13	50 4 ...	20 1' 5"	0.1946 ...	0.3731 ...	0.42
14	50 57 ...	19 51' 5"			
15	51 49 ...	19 41' 0"			
16	52 41 ...	19 31' 2"			

This comet will soon be lost in the rays of the sun. The unit of brightness took place on November 21.5, 1892.

COMET HOLMES (1892, III.).—M. Schulhof gives the following ephemeris of this comet for the ensuing week:—

1893.	R. A. (app.) h. m. s.	Decl. (app.) ° ' "
March 9	2 43 7.1 ...	35° 8' 11"
10	44 52.2 ...	10 58
11	46 37.2 ...	13 46
12	48 23.4 ...	16 35
13	50 9.4 ...	19 24
14	51 55.7 ...	22 14
15	53 42.2 ...	25 3
16	55 29.0 ...	27 53

UNIVERSAL TIME.—On February 6 last the Bill declaring the legal time for Germany to be that of the 15th meridian east of Greenwich, that is, one hour in advance of Greenwich time, passed the third reading. This law will be brought into force on April 1. The *Observatory* for March informs us that, in a letter addressed to the Astronomer Royal, it is stated by Dr. Schran that a similar Bill has been laid before the Austrian Government, and "it is hoped that the change will be made simultaneously with Germany." The draft of the latter Bill, which we take from the same number, provides:—

(1) That the legal time in Austria is the mean solar time of the meridian 15° east of Greenwich. The same to replace, on April 1, 1893, the present local times for legal, civil, and all other purposes.

(2) The Government is authorised to make the changes in the school and industrial hours which will become necessary in consequence of the adoption of the above.

THE BIELIDS, 1892.—M. Bredichin, in *Astronomischen Nachrichten*, 3154, has a short note on the Bielids, in which he says that the observations made in America on November 23 last show that the meeting of the densest part of this swarm with the earth has taken place almost four days earlier than in the year 1885, or, in other words, that the descending node of the stream has receded almost 4° to the west during the period between the end of 1885 and the end of 1892. The cause of this recession is, he says, due to Jupiter, the perturbations set up by this planet accounting for the mean daily motion which is nearly equal to that possessed by Biela's comet.

An approximate computation of the special perturbations for the whole period during which Jupiter had any influence gave